DEVICE TO BE FASTENED TO A SUPPORT WHICH IS PROVIDED WITH A THREADED BOLT

BACKGROUND OF THE INVENTION

[0001] This invention relates to a device to be fastened to a support that is provided with a threaded bolt.

[0002] Such a device is disclosed by DE 195 33 138 C1. In the previously known device, the screw component is screwed onto a threaded section of the threaded bolt and there is an abutment area against which the screw component rests in its final position. The screw component has a first engagement structure in the form of radially extended flat projections. There is also a rotatable part that has a second engagement structure in the form of receptacle pockets over-dimensioned radially with respect to the flat projections, which is engaged with the first engagement structure, with the screw component and the part being movable radially with respect to one another, at least before assuming the final position. The screw component is thereby mounted to float in the part.

[0003] DE 200 23 083 U1 discloses a clamp with a female fastening element that has a plurality of movable segments, which engage on the profile of a male fastening element. This produces a rotationally fixed connection between the female fastening element and the male fastening element.

[0004] Other devices for fastening to a support which has a threaded bolt are known in the art and have a screw component in the form of a threaded nut that can be screwed onto a threaded section of a threaded bolt to rest against an abutment area in its final position. Cable holders connected to the previously known devices, for example, can in fact be fastened to threaded bolts, but they have the drawback that with a position relative to the support to be preserved, tolerances in the positioning of the threaded bolts cannot be compensated for, or only in extremely limited fashion, for purposes of automated assembly.

[0005] The task underlying the invention is to describe a device of the type mentioned initially, with which a definite set arrangement with respect to the support can be preserved with automated assembly, even in case of radial tolerances in the positioning of threaded bolts.

SUMMARY OF THE INVENTION

[0006] This task is accomplished pursuant to the invention by a device to be fastened to a support that is provided with a threaded bolt, with a screw component that can be screwed onto a threaded section of the threaded bolt, and with an abutment area on which the screw component rests in its final position, wherein the screw component has a first engagement structure, there is a rotatable part that has a second engagement structure that is engaged with the first engagement structure, and the screw component and the part are movable radially with respect to one another, at least before assuming the final position, characterized by the fact that the part designed as a drive component with a tool stud structure in rotationally fixed engagement with the screw component, can be engaged with a hand tool.

[0007] By providing that the screw component and the drive component are engaged with one another with radial mobility and rotationally fixed, and thus the screw component is also turned by the interaction of the engagement structures when the drive component is turned by the engagement of a hand tool with the tool stud structure, radial tolerances in the positioning of the threaded bolts can be compensated for even with a set positioning relative to the support.

BRIEF DESCRIPTION OF THE DRAWINGS

[0008] A preferred example of embodiment of the invention is described below with reference to the figures. The figures show:

[0009] Fig. 1 an example of embodiment of the invention in a perspective exploded view that is integrated in a cable holder and that has a screw component and a drive component mounted in a ring cage,

[0010] Fig. 2 the example of embodiment of Fig. 1 in another perspective exploded view,

[0011] Fig. 3 the example of embodiment of Fig. 1 and Fig. 2 in a cutaway perspective view enlarged relative to the scale of Fig. 1 and Fig. 2, in the area of the screw component and the drive component, and

[0012] Fig. 4 the example of embodiment of Fig. 1 to Fig. 3 in a cross-sectional view in the area of the screw component and the drive component in a final position of the screw component on a threaded bolt.

[0013] Corresponding reference characters indicate corresponding parts throughout the several views. Although the exemplifications set out herein illustrate embodiments of the invention, in several forms, the embodiments disclosed below are not intended to be exhaustive or to be construed as limiting the scope of the invention to the precise forms disclosed.

DESCRIPTION OF THE PRESENT INVENTION

[0014] Fig. 1 in a perspective exploded view shows an embodiment of the invention that is integrated into a cable holder 1. The cable holder 1 in a known manner has a first holder arm 2 and a second holder arm 3, each of which is designed with end cheeks 4 and intermediate cheeks 5 between the end cheeks 4 to hold cables.

[0015] In the illustrated example of embodiment of the invention, there is an essentially hollow-cylindrical ring cage 6 that is positioned between the holder arms 2, 3 and is connected to them. A bottom ring 7 is set on one axial end face of the ring cage 6 as an abutment area that extends from a wall 8 of the ring cage 6 radially inward, with a feed-through area 9 remaining open. At the axial end face of the ring cage 6 opposite the bottom ring 7 there is a latch structure 10 made up of catches extending radially inward.

[0016] The illustrated embodiment also has a screw component 11 that has an outer ring 12. The outside diameter of the outer ring 12 is smaller than the inside diameter of the ring cage 6, so that the screw component 11 has radial clearance in the ring cage 6. Two opposite internal catches 13 extend from the radially inner face of the outer ring 12. The internal catches 13 have a recess 14 in the form of a circular arc on their sides that face one another, and are made to have a certain elasticity radially. There are also a number of driver lugs 15 of a first engagement structure placed on the outer ring 12, which extend away from the outer ring 12 in the direction of adjustment of the internal catches 13. In the illustrated example of embodiment, the driver lugs 15 are made with outer walls 16 arched outward and rounded off.

[0017] Finally, the illustrated example of embodiment has a drive component 17 that is designed with a cover ring 18 circular on the outside. The outside diameter of the cover ring 18 corresponds essentially to the inside diameter of the ring cage 6. Placed on the cover ring 18 are

a number of driver projections 19 of a second engagement structure projecting radially beyond the cover ring 18, and a formed section 20 projecting beyond the cover ring 18 in the other axial direction as a tool stud structure. The formed section 20 is attached to engage with a hand tool with which the drive component 17 can be turned.

[0018] When the present embodiment is assembled, the face of the outer ring 12 opposite the driver lugs 15 rests on the bottom ring 7 and is positioned loosely in the ring cage 6, while the cover ring 18 is engaged with the latch structure 10 and is thus fixed both axially and radially.

[0019] Fig. 2 shows the example of embodiment of Fig. 1 in another perspective exploded view, viewed from a direction opposite to the view according to Fig. 1. It is especially clear from Fig. 2 that a centering socket for a threaded bolt, not shown in Fig. 2, is provided by adjusting the internal catches 13 in a direction away from the bottom ring 7. It can also be seen in Fig. 2 that the outer walls 21 of the driver projections 19 are arched outward and rounded off.

[0020] Fig. 3 in a cutaway perspective view on an enlarged scale compared to Fig. 1 and Fig. 2, shows the example of embodiment of Fig. 1 and Fig. 2 in the area of the screw component 11 and the drive component 17 in radial cross section, in about the central area of the ring cage 6.

[0021] Fig. 3 shows that the rounded outer walls 16, 21 of the driver lugs 15 and of the driver projections 19 lead to the same type of contact between the engagement structures and thus to equivalent screwing properties relative to the drive component 17 in the various positions of the screw component 11 even with the radial clearance of the outer ring 12 in the ring cage 6.

[0022] Fig. 3 also shows that the internal catches 13 are formed on a receptacle ring 22 that is encircled by the outer ring 12. The internal catches 13 and the receptacle ring 22 are preferably made of a metal that is very resistant to bending and to abrasion, with the receptacle ring 22 being extrusion-coated with a plastic material constituting the other parts of the screw component 11.

[0023] Fig. 4 shows a cross-sectional view of the example of embodiment of Fig. 1 to Fig. 3 in the area of the screw component 11 and the drive component 17 in a final position of the screw component 11 on a threaded bolt 23 that has external threads 24 and is connected to a support, not shown in Fig. 4. It can be seen in Fig. 4 that the faces of the driver lugs 15 rest on the cover ring 18 and the faces of the driver projections 19 rest on the outer ring 12, so that the screw component 11 also is mounted in the ring cage 6 essentially with no axial clearance.

[0024] It can be seen from Fig. 4 that because of the radial clearance of the screw component 11 relative to the ring cage 6 and because of the engagement of the driver lugs 15 and the driver projections 19 constituting the engagement structures, when the drive component 17 turns, the internal catches 13 slide along the external threads 24 and thus firmly connect the cable holder 1 to the support even with radially displaced arrangement of the longitudinal axes of the screw component 11 and of the drive component 17.

[0025] It can also be seen in Fig. 4 that because of the funnel-like position of the internal caches 13 in the direction of insertion of the threaded bolt 23, the screw component 11 is automatically aligned, so that starting from a preassembled position, the cable holder 1 can be plugged into an intermediate assembly position in a first assembly step, with the internal catches 13 elastic in the direction of insertion passing over the threads on the threaded bolt 23, before the fastening in the final assembled position takes place in a second assembly step by turning the drive component 17. The correct completion of the second assembly step can be checked by reaching a given elevated tightening torque acting against the screwing direction on the internal catches 13, and placing them under a definite prestress; it is assured by the rounded design of the outer walls 16, 21 that no elevated tightening torque occurs before the final position is reached indicating falsely that the second assembly step has been correctly completed.

[0026] While this invention has been described as having a preferred design, the present invention can be further modified within the spirit and scope of this disclosure. This application is therefore intended to cover any variations, uses, or adaptations of the invention using its general principles. Further, this application is intended to cover such departures from the present disclosure as come within known or customary practice in the art to which this invention pertains and which fall within the limits of the appended claims.